WATER POWERS

FRASER RIVER

BRITISH COLUMBIA

CANADA

1938

DEPARTMENT OF LANDS

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water
FRASER RIVER.

FOREWORD BY THE PREMIER OF BRITISH COLUMBIA.

POWER, mechanically produced and widely applied, is the basis of our present civilization and culture.

Primitive man, who depended on his own physical effort to supply his needs, was never able to accumulate a surplus, and never had the leisure to give effective thought to his future well-being.

Slavery and the domestication of animals relieved a favoured few from incessant soul-destroying toil. But until man learned to use a power which did not compete with him for food, which could be developed in large units and effectively controlled, he was never able to make real progress toward comfort and security.

A great inexhaustible source of such power is the energy in our falling streams.

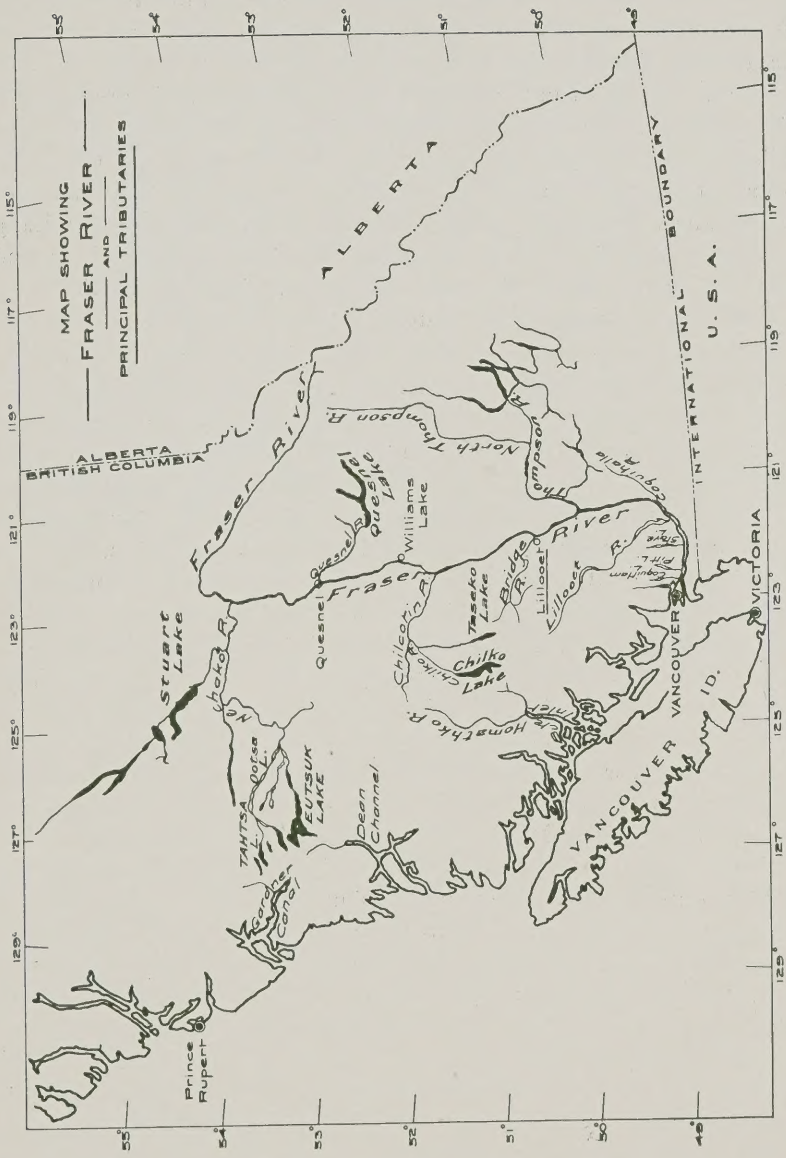
British Columbia has been greatly favoured by nature, and investigation has proven conclusively that there is available very much more potential water-power than was previously thought.

T. D. PATTULLO.

INTRODUCTION.

SINCE the discoveries of the pioneers in the electrical field made it possible to transmit the energy of a stream to any convenient place of use, the development of water-power has proceeded at an ever-increasing rate. There is no reason to anticipate a pause.

Until the last decade a large water-power possibility to be attractive had to be capable of progressive development to keep pace with a demand increasing at a moderate rate. Within the last few years a number of projects in various parts of the world with initial developments in the hundreds of thousands of horsepower have been begun. This tendency serves to draw attention to other schemes which have not been considered feasible because of the initial capital outlay involved. The powers in the Fraser River drainage system in British Columbia are in this class. The time seems opportune to tell what is known of this great river and its tributaries.

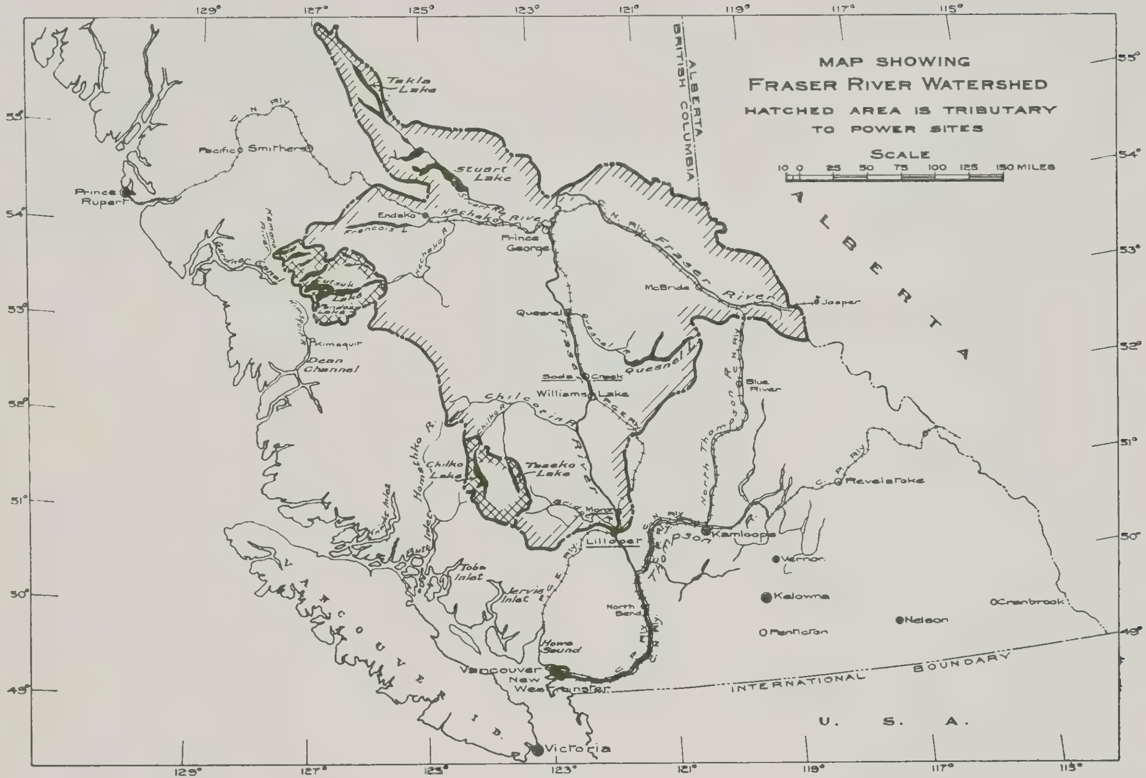

MAP SHOWING
FRASER RIVER
AND
PRINCIPAL TRIBUTARIES
ALBERTA
BRITISH COLUMBIA
INTERNATIONAL BOUNDARY
U. S. A.
Fraser River
North Thompson R.
Thompson R.
Quesnel R.
Quesnel Lake
Quesnel
Williams Lake
Stuart Lake
Chilcotin R.
Chilko R.
Chilko Lake
Taseko Lake
Bridge R.
Lillooet
Lillooet R.
Homathko R.
Coquihalla R.
Coquitlam
Pitt L.
Stave L.
Nechako R.
Ootsa L.
TAHTSA L.
EUTSUK LAKE
Dean Channel
Gardner Canal
Prince Rupert
VANCOUVER
VANCOUVER ID.
VICTORIA

DESCRIPTION OF THE RIVER.

THE Fraser River system in British Columbia drains the west slope of the Continental Divide between latitudes 52–30 and 55–30 and the eastern slope of the Coast Range between the 49th and 56th parallels. These mountain ranges have relatively high precipitation. The drainage of the west slope of the Rockies south of the 53rd, of the Selkirks, and the eastern slope of the Gold Range is cut off by the Columbia River system. The watershed of the Fraser includes the great plateau which lies south of latitude 54 between the Coast Range to the west and the Rockies and Gold Range to the east and extends a narrow arm as far north as the 56th parallel between the Peace and Skeena River systems. This plateau has a relatively low precipitation.

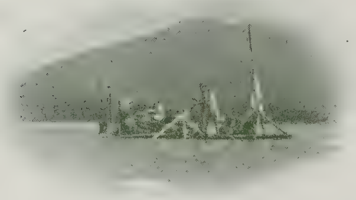
From its source in Fraser Pass the river flows in a north-westerly direction through a steep and narrow canyon for about 75 miles to Tete Jaune Cache, where it reaches the bottom of the intermontane valley, a pronounced feature of British Columbia topography. It follows this valley in the same general direction at a navigable grade for 150 miles to a point a few miles north of latitude 54, where it makes an abrupt turn and at Prince George, 20 miles farther down, is flowing directly south. At this point it is joined by the Nechako, which drains an extensive system of lakes to the west and north-west. About 70 miles south at Quesnel the river is joined by the Quesnel River, which drains a system of lakes lying between the main channel of the Fraser and its headwaters. At Quesnel the river begins to cut itself an ever-deepening gorge through the plateau. About 100 miles farther south it is joined by the Chilcotin, a tributary from the west, which is important from the power viewpoint. In its progress south it gradually approaches the Coast Range. About 75 miles below the mouth of the Chilcotin it is joined by Bridge River from the west, and 40 miles farther south at Lytton by its main tributary, the Thompson, from the east. At Lytton the river begins to cut a diagonal course through the Coast Range and at Hope it turns definitely westward to the Gulf of Georgia. Although in its lower course it approaches within 8 miles of the International Boundary, it is from source to mouth entirely a British Columbia stream.

The area of the watershed is 91,000 square miles. The run-off over a period of twenty-five years has averaged 1 cubic foot a second per square mile. The river is glacier-fed and is subject to wide fluctuations of flow. Extremes of 12,000 cubic feet a second minimum and 392,000 cubic feet a second maximum have been recorded at Hope.

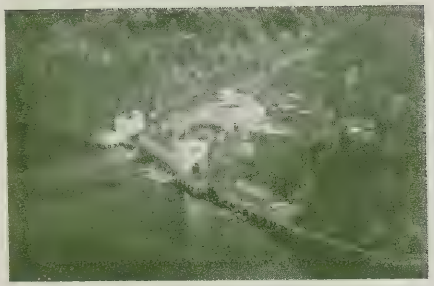

MAP SHOWING
FRASER RIVER WATERSHED
HATCHED AREA IS TRIBUTARY
TO POWER SITES
SCALE
10 0 25 50 75 100 125 150 MILES
ALBERTA
BRITISH COLUMBIA
ALBERTA
U. S. A.
INTERNATIONAL BOUNDARY
Takla Lake
Stuart Lake
Prince Rupert
Pacific
Smithers
Endako
Francois L.
Nechako River
Prince George
McBride
Fraser River
Jasper
C. N. Rly
Quesnel
Quesnel L.
Soda Creek
Williams Lake
Fraser River
Chilcotin R.
Blue River
North Thompson R.
Kimsquit
Dean Channel
Homathko R.
Chilko Lake
Taseko Lake
Toba Inlet
Jervis Inlet
Howe Sound
Lillooet
Kamloops
Thompson R.
Revelstoke
Vernon
Kelowna
Penticton
Nelson
Cranbrook
North Bend
C. P. Rly
Vancouver
New Westminster
Victoria
Vancouver Id.
129°
127°
125°
123°
121°
119°
117°
115°
55°
54°
53°
52°
51°
50°
49°

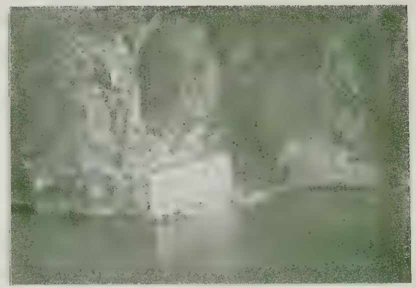
Although the lakes within the system north of Lytton lie near the sources of the tributaries and have only a minor natural regulatory effect, they are capable of development as important storage-basins. Their combined area is 850 square miles. Where land which might be flooded by the storage-dams is privately owned, property values are very low.

The Fraser is subject to floods which frequently cause severe damage to the valuable agricultural lands in the lower valley. The question of storage in the lakes as a preventive measure is being considered. It is worthy of note that storage for power purposes is generally of great value for flood regulation.



Transportation on surveys.



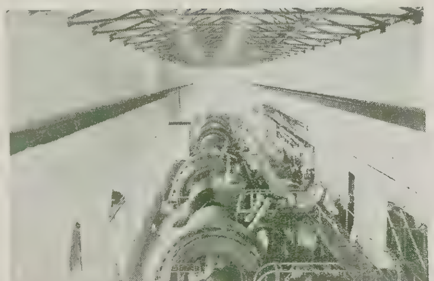


THE BUNTZEN-COQUITLAM PLANTS.

No. 1 Power-house, capacity, 28,200 horse-power. No. 2 Power-house, capacity, 35,800 horse-power. Static head on both plants, 400 feet.

No. 1 Power-house.

No. 2 Power-house.



THE POWER POSSIBILITIES OF THE RIVER.

WHEN the demand arises, the waters of the Fraser River are capable of furnishing over 6,000,000 horse-power.

The possibilities of development will be considered commencing at the mouth and proceeding up the main river and tributaries.

As might be assumed, there are a number of power-sites in the lower reaches of the river where it breaks through the Coast Range. It has been roughly estimated that 500,000 horse-power awaits development in this section. But two trans-continental railroads and a trans-provincial highway parallel the watercourse, and the difficulty and expense of relocating and reconstructing these facilities, while not insurmountable, are so serious that consideration of power-development in this part of the stream may be left to the more distant future.

Between Lytton and Quesnel the river flows in a deep gorge through the central British Columbia plateau and has a fall of 1,080 feet. In this section, with storage easily obtained in the lakes above, a regulated flow of from 20,000 to 25,000 cubic feet a second can be maintained. The development of 2,000,000 horse-power depends on the possibility of the creation of head by means of high dams. Cross-sections in rock, necessary for such structures, have been located and surveyed, but the suitability of the rock as a foundation for dams of the height indicated has not yet been definitely established.

Between Quesnel and Prince George there is a further head of 200 feet, all of which may be difficult to utilize. With a smaller possibility of regulated flow, it is estimated that a further 300,000 horse-power may be obtained. Above Prince George the river does not lend itself to the development of power.

Of the tributaries, three—the Coquitlam, Alouette, and Stave—have already been developed. The Coquitlam furnishes water to the two Buntzen plants having a total capacity of 64,000 horse-power, the Alouette has an automatic plant of 12,000 horse-power, while the Stave furnishes water to the Stave Falls plant of 79,000 horse-power in addition to the Ruskin plant of 94,000 horse-power.

Pitt, Lillooet, Jones, and Coquihalla Rivers have all some power potentialities.

Thompson River between Lytton and Savona is like the Lower Fraser—railways and highways in close proximity to the river tend to make power-development more difficult and expensive. Its tributaries, however, of which the most important are Adams and Murtle Rivers, are capable of producing a total of 125,000 horse-power.

Ruskin Plant.

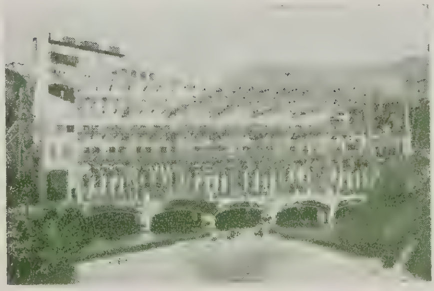
Present capacity, 94,000 horse-power; ultimate capacity, 188,000 horse-power; static head, 125 feet.

Exterior.

Generator-room.

(Copyright by Western Canada Airways, Ltd.)

Aerial view—Ruskin.



Stave Falls Plant.

Capacity, 79,000 horse-power; static head, 130 feet.

Alouette Plant.

Capacity, 12,000 horse-power; static head, 135 feet.

The Bridge River, which heads in the Coast Range, and joins the Fraser at Lillooet, approaches at one point in its course to within 3 miles of Seton Lake. The difference of elevation between the river and Seton Lake is about 1,200 feet and the major development of this power by means of a tunnel through the intervening range contemplates an ultimate installation of turbines totalling 600,000 horse-power.

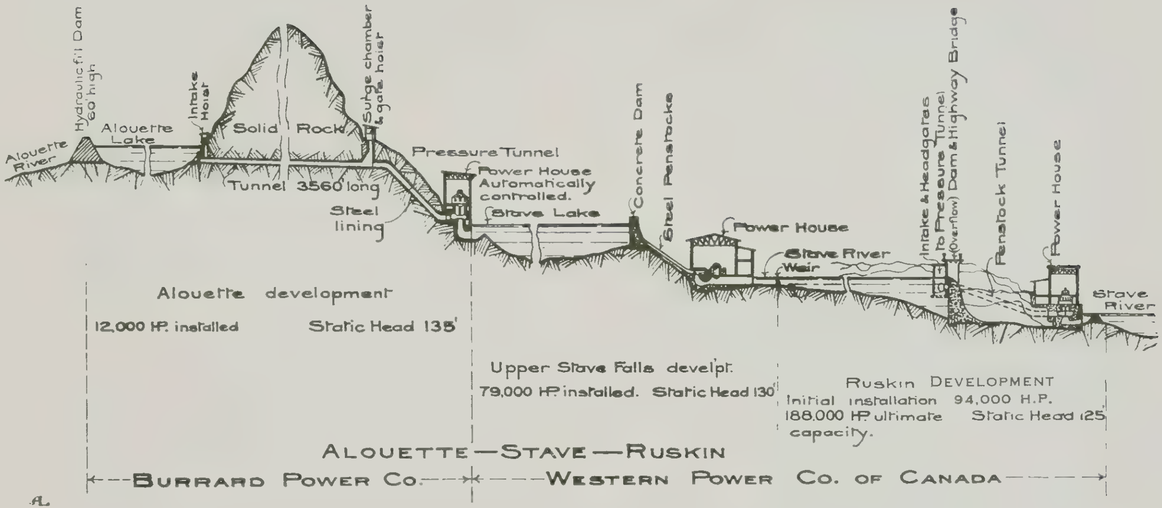
Proceeding up-stream, the next important tributary is the Chilcotin River. Chilko Lake at the headwaters of the Chilcotin lies high up in the range and at points approaches within a few miles of the Divide. On the other side the Southgate and Homathko Rivers cut deep channels back from tide-water at the head of Bute Inlet toward the summit. By tunnel through the range, the water of the lake, which has a natural course of 400 miles in length to the sea, can be short-circuited, and a grand total of about 1,000,000 horse-power can be developed.

Quesnel River, which drains the portion of the plateau lying between the main channel of the Fraser and its headwaters, has a number of smaller power-sites, totalling in the aggregate 100,000 horse-power.

Nechako River, which joins the Fraser at Prince George, has similar power potentialities to the Chilcotin. Eutsuk Lake at the headwaters, with a natural outlet of 600 miles in length to the sea, approaches within 2 miles of the Divide and is within 22 miles of tide-water at Dean Channel. A head of 2,160 feet and a total of 910,000 horse-power can be developed.

Tahtsa Lake, also on the headwaters of the Nechako, is at its nearest point slightly over a mile from the Divide and about 20 miles from tide-water in Gardner Canal. A head of 2,560 and a total of 845,000 horse-power can be developed.

It is of interest to note that, if the waters of Chilko Lake and the Eutsuk and Tahtsa Lakes were diverted through the Coast Range, the flow of the main Fraser River would only be reduced some 9½ per cent.



Diagrammatic profile of the Alouette-Stave Falls-Ruskin developments of the Burrard Power Company, Limited, and the Western Power Company of Canada, Limited.

ENGINEERING DATA AND REPORTS.

MEASUREMENTS of flow of the Fraser River at Hope have been maintained over a period of twenty-six years. By comparison with shorter-term measurements at other points, an estimate of the flow between Lytton and Quesnel can be secured. Stations have been recently established on the river between the points above mentioned and on the Chilko and Nechako tributaries.

Aerial photographs of the main canyon of the Fraser have been taken.

A small staff of Departmental Engineers have been intermittently engaged for some years making surveys and collecting data, and have prepared a number of preliminary engineering reports. These investigations cover the topography of the areas around the dam-sites and related flood areas along the main river, the various possible diversions of the Chilko Lake waters through the Coast Range to the Homathko and Southgate Rivers, and those of the Nechako River via Eutsuk and Tahtsa Lakes to the coastal waters of the Kimsquit and the Kemano Rivers. The Quesnel River sites have also been investigated by the Departmental Engineers. These reports are not printed, but are compiled in manuscript and map form and kept for study and reference. Copies are available to any one interested on payment of the actual cost of typing the text and printing the maps, charts, and photographs.

The Bridge River Power Company has prepared complete construction plans for the development of the Bridge River.

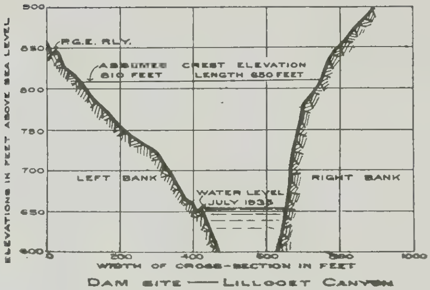
An endeavour was made in the previous pages to give a general description of the river and to indicate its large power potentialities.

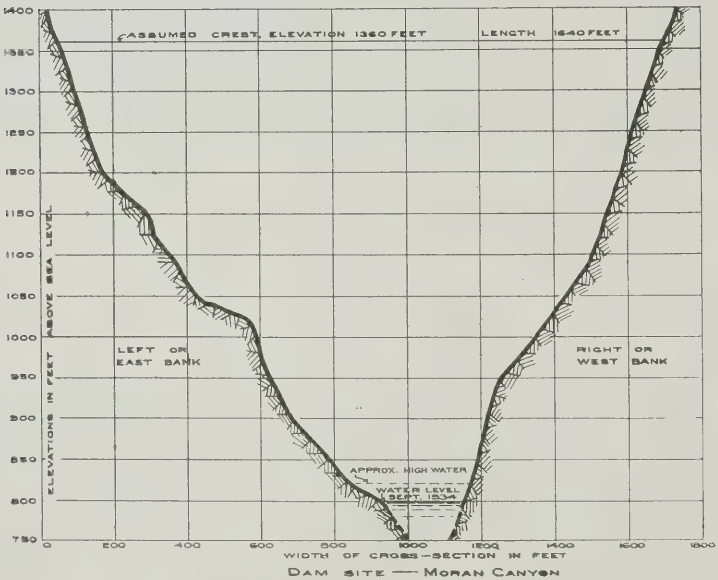
The following pages will outline how it is possible to develop these powers and will support the suggestions with data obtained from various sources and from survey parties in the field.

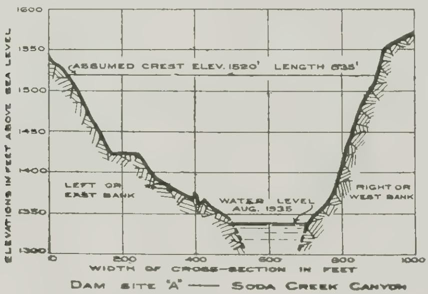
Dam-site just above Lillooet, looking up-stream.

Dam-site at Moran, 20 miles above Lillooet, looking down-stream.

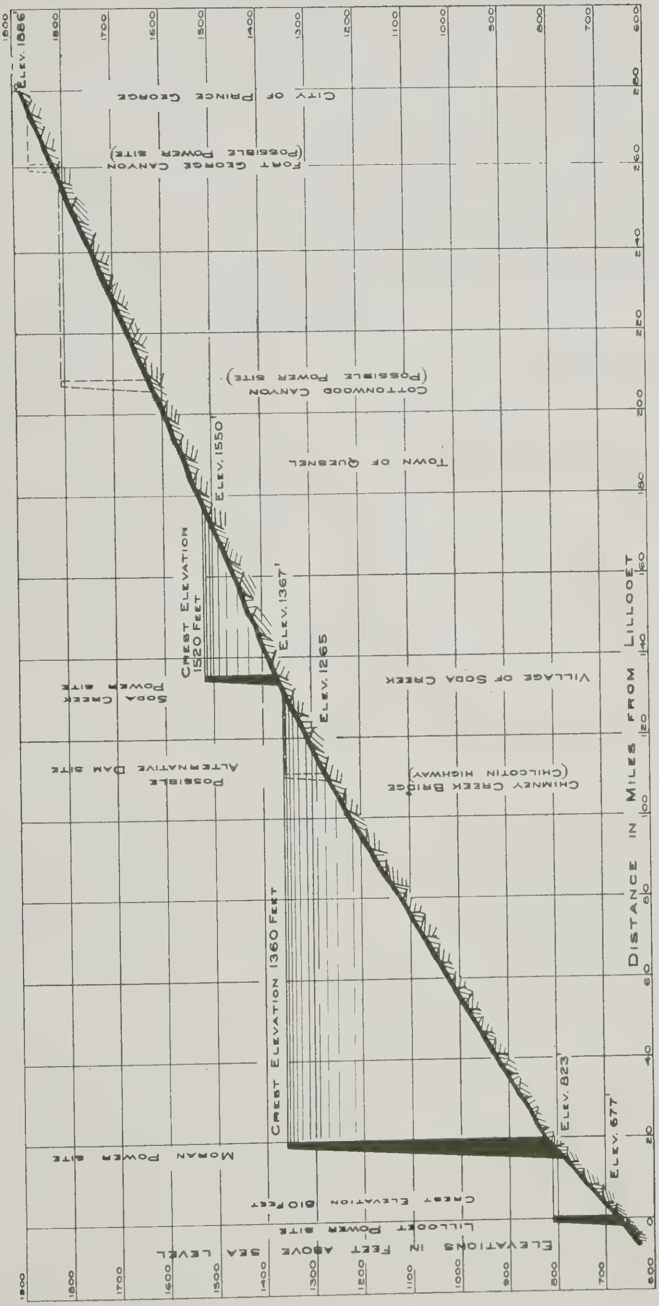
FRASER RIVER POWER-SITES.







Profiles, Fraser River Power-sites.



FRASER RIVER BETWEEN LILLOOET AND PRINCE GEORGE

THE MAIN RIVER.

BETWEEN LYTTON AND QUESNEL.

AS MENTIONED earlier and indicated in the accompanying profile, the Fraser River between Lytton and Quesnel has a considerable gradient, and the development of power requires concentration of head at high dams. The rock-outcroppings across the river suggest the possibility of power-sites at three points; i.e.:—

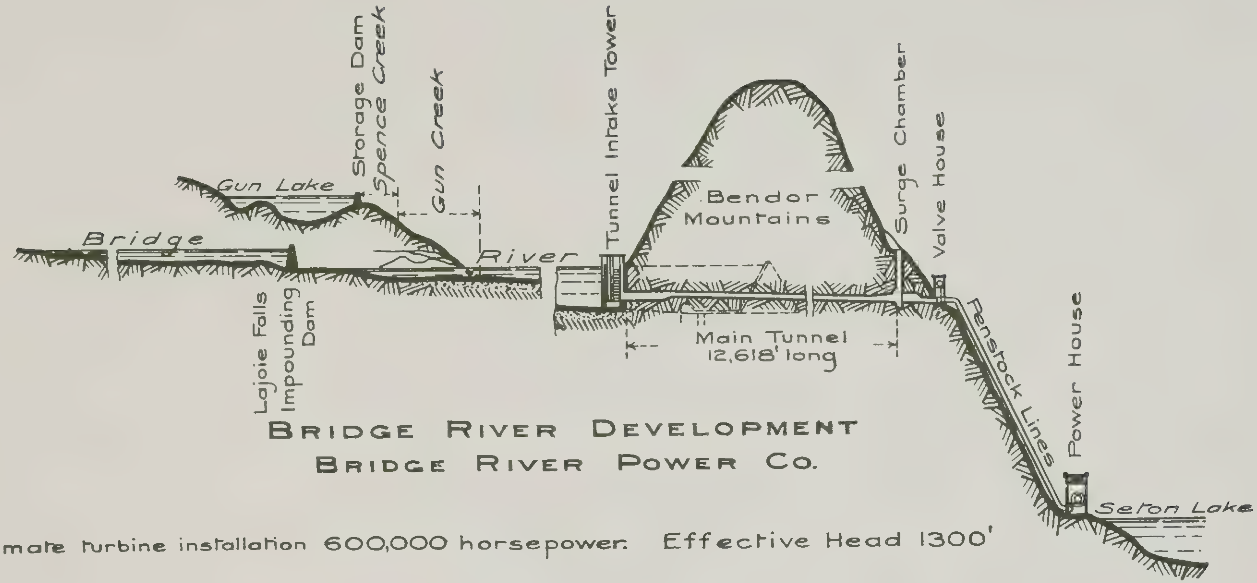
(1.) Just above Lillooet. The exposed rock rises to an elevation above river-level of about 140 feet. The estimated regulated flow at this point is about 25,000 cubic feet a second and should make possible a development of 370,000 horse-power. Track spurs from the Pacific Great Eastern Railway can be installed on both sides of the river.

(2.) At Moran, 20 miles above Lillooet. Here the rock-outcrops rise above the 560-foot level, and a dam at this point would back the water to the next site at Soda Creek. The estimated regulated flow is also 25,000 cubic feet a second, and in this case 1,320,000 horse-power could be developed. The main line of the Pacific Great Eastern is about a mile distant, but is 1,800 feet in elevation above the river-bed. This would probably require an incline railway to convey heavy machinery to the power-site.

(3.) At Soda Creek Canyon. Here rock outcrops to a height of 160 feet above the river. The estimated regulated flow is 20,000 cubic feet a second and a development of 310,000 horse-power should be possible. The Pacific Great Eastern is close to the site in both distance and elevation.

BETWEEN QUESNEL AND PRINCE GEORGE.

NO POWER surveys have been made of this section of the river, but from information available it is estimated that a flow of 14,000 cubic feet a second can be maintained and a head of 200 feet developed, permitting an installation of 300,000 horse-power.



BRIDGE RIVER DEVELOPMENT
BRIDGE RIVER POWER CO.

Ultimate turbine installation 600,000 horsepower. Effective Head 1300'

THE TRIBUTARIES.

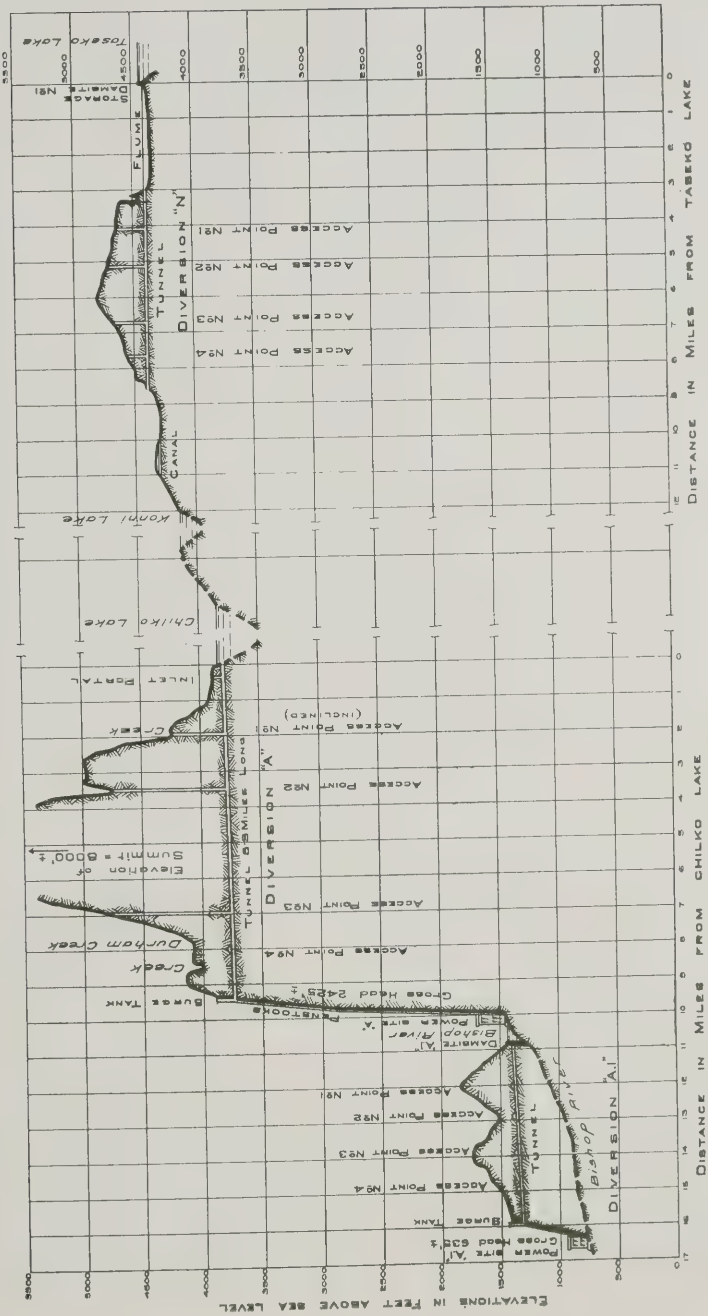
BRIDGE RIVER.

BRIDGE RIVER rises on the east slope of the Coast Range and joins the Fraser about 5 miles above the town of Lillooet. In the last 28 miles of its course it has a fall of 1,400 feet in a precipitous and inaccessible canyon. At the beginning of this drop it approaches within 3 miles of Seton Lake, which lies in a parallel valley about 1,200 feet below the river-bed. Above this point for 30 miles the river has a sluggish flow in the valley about a mile wide. Farther up, above intervening rapids, two other flat stretches of the river and one lake nearly 2,000 acres in area provide extensive additional storage possibilities. The river has a recorded maximum flow of 26,000 cubic feet a second, a minimum of 164, a mean over seventeen years of record of 3,720, and a possible regulated flow of 3,000 cubic feet a second. The scheme of development proposed by the Bridge River Power Company, which holds a licence to utilize this power, consists of a tunnel 13,200 feet in length already completed, a penstock 2,200 feet in length with an ultimate effective head of 1,300 feet, a temporary diversion-dam 40 feet high, an ultimate combined diversion and storage dam at the tunnel intake 185 feet high, three storage-dams 190 feet, 165 feet, and 45 feet high respectively at points higher up the river. The continuous horse-power available is 350,000; this will permit a water-wheel or turbine installation of 600,000 horse-power as mentioned previously.

A small temporary plant has been built to provide power for the local mining industry.

QUESNEL RIVER.

PRELIMINARY reports have been made on three sites on this river, which are estimated to give: At Swamp River 20,000 horse-power, at Little Canyon 9,600, and at Big Canyon 50,000. There are a number of smaller sites suitable for individual mining operations which bring the total available power to over 100,000 horse-power.



TASEKO—CHILKO—SOUTHGATE SCHEME

CHILCOTIN RIVER.

THE proposed use of the waters of this stream for the development of power is referred to as the Chilko-Coast diversion. Chilko Lake at the headwaters of Chilcotin River has an area of 70 square miles and can be developed as a storage-basin either by damming the outlet or drawing down below the natural level, or by a combination of these methods. The estimated regulated run-off is 1,700 cubic feet a second, which may be supplemented by a further 1,500 cubic feet a second by a diversion from Taseko River.

Three general diversion schemes have been investigated: A. Through Chilko Pass. B. Through Franklin Pass. C, D, E. Through Tatlayoko Lake and Homathko River.

A. By Chilko Pass to Bishop River, a tributary of Southgate River.

This diversion would require 9 miles of tunnel having four possible intermediate points of access, penstock 4,400 feet long under a head of 2,420 feet, and would permit a development of 852,000 horse-power. The water may then be rediverted from the tail-race to the junction of Bishop and Southgate Rivers through a side-hill tunnel 5.2 miles long and 1,750 feet of penstock under a head of 635 feet where a further 223,000 horse-power could be developed. These tunnels would probably all be in the sound granitic rock of the Coast Range batholith.

B. By Franklin Pass from the head of Franklin Arm to Southgate River.

This diversion would require 17.3 miles of tunnel with frequent points of comparatively easy access, 6,000 feet of penstock under a head of 3,060 feet, and in this case 1,080,000 horse-power could be developed. As an alternative this diversion may be divided into:—

B 1. 12.1 miles of tunnel with nine intermediate access points, penstock 2,580 feet long under 1,530 feet of head where 540,000 horse-power should be possible of development.

B 2. 3.8 miles of side-hill tunnel under 1,525 feet of head where 540,000 horse-power could be developed.

C, D, E. Diversion to Tatlayoko Lake and through Homathko River to Bute Inlet.

C and D are alternative tunnel-lines with penstocks under 1,128 feet of head to Tatlayoko Lake.

E is a combined canal and short tunnel-line from Choelquoit Lake to Tatlayoko Lake with penstocks similar in length and head to those of C and D. The power possible of development at Tatlayoko Lake

Plan of Chilko-Coast diversions.

Dam-site at outlet of Chilko Lake.

with a balanced flow of 3,200 cubic feet a second from Chilko Lake would be 400,000 horse-power. The outlet of Tatlayoko Lake, which has an area of 16.3 square miles, is not suitable for the construction of a high dam. It is probable, however, that by lowering the lake-level and building an earth dam of moderate height, a considerable part of the natural run-off through the lake may be stored. In Tatlayoko Lake the water which is diverted from Chilko Lake supplemented by the local run-off may be impounded and power developed at a number of sites in the steep and rugged canyon of the Homathko River.

Homathko River.—Proceeding down the river, the first site is at

Shelter Canyon, where a dam 300 feet high with power-house connected would develop 100,000 horse-power (shown as Power Site " F " on the plan). The next site is at

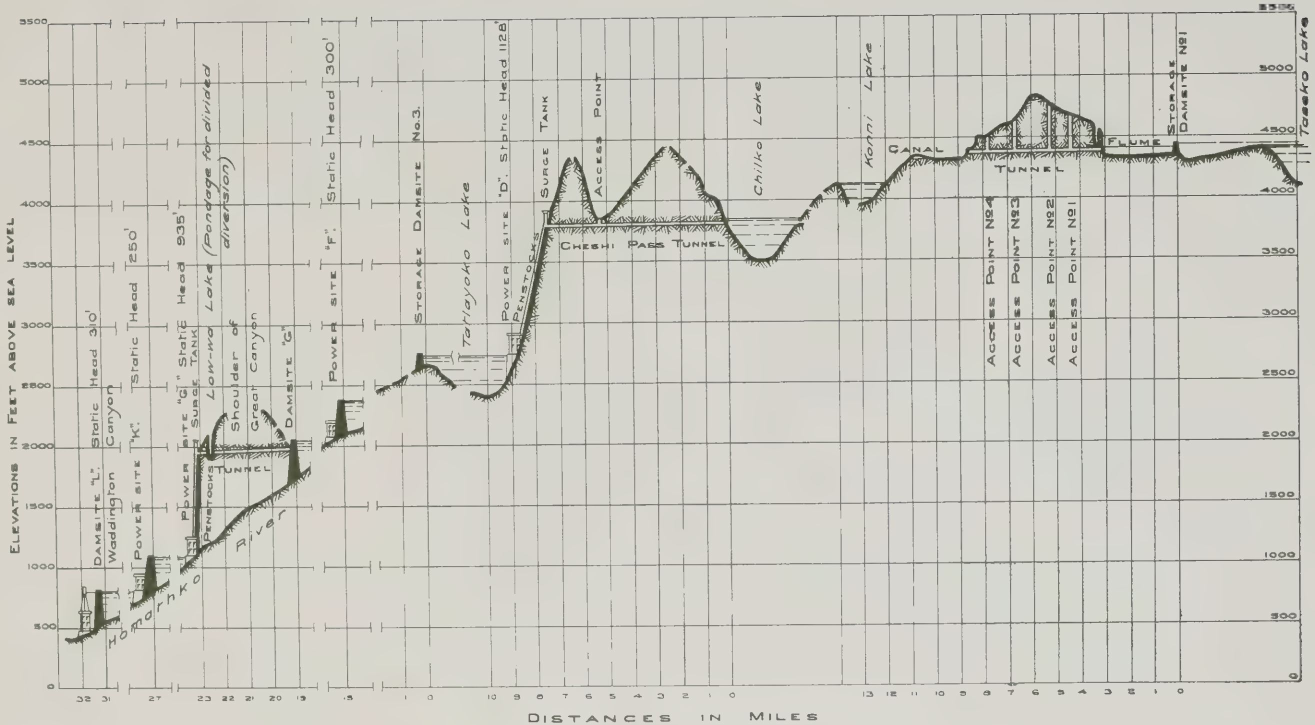
Nude Canyon, where the surveys suggest a dam 300 feet high with a side-hill tunnel 4 miles long and penstocks under 935 feet head, with the alternative of a break in the line and an intermediate power-house and regulating storage at Lowha Lake, either scheme possible of a 330,000-horse-power development (shown as Power Site " G "). The next site is at

Tragedy Canyon, where a dam 250 feet high with power-house connected is indicated. With the increasing flow due to the run-off of the Homathko River 175,000 horse-power can be developed (shown as Power Site " K "). The last site is at

Waddington Canyon, where a dam 300 feet high with a power-house connected by a tunnel 1,500 feet long would develop 215,000 horse-power (shown as Power Site " L ").

Transportation.—Transportation is a major problem. The nearest rail point east of the Coast Range is at Williams Lake, on the Pacific Great Eastern Railway, about 150 miles by road from Chilko Lake. West of the range a railroad, which would be of value for logging, can be constructed without serious difficulty 30 miles up the Southgate River from the head of Bute Inlet to the lowest power-house site. Through the Homathko Canyon a grade would encounter rugged country.

Taseko River (Diversion N).—In this summary a regulated flow of 3,200 cubic feet a second from Chilko Lake is assumed. This can only be obtained by the addition of the waters of the Taseko River. The diversion proposed from Taseko River would require a combined storage and diversion dam 100 feet high about 3 miles below Taseko Lake, flume 3.6 miles long, and tunnel 5.1 miles long to Elkins Creek, rediversion by low dam from Elkins Creek through open channel 1.4



TASEKO—CHILKO—HOMATHKO SCHEME

miles long to a point from which the water can flow by gravity through Konni Lake and Nemaia Valley to Chilko Lake. The available flow in Taseko River is estimated to be about 80 per cent. of that naturally available in the Chilko River.

Modern transportation.


Sketch Map
NECHAKO-
COAST
diversions
LEGEND
Dam
Penstock
and Power House
Tunnel
Flume
Scale of Miles

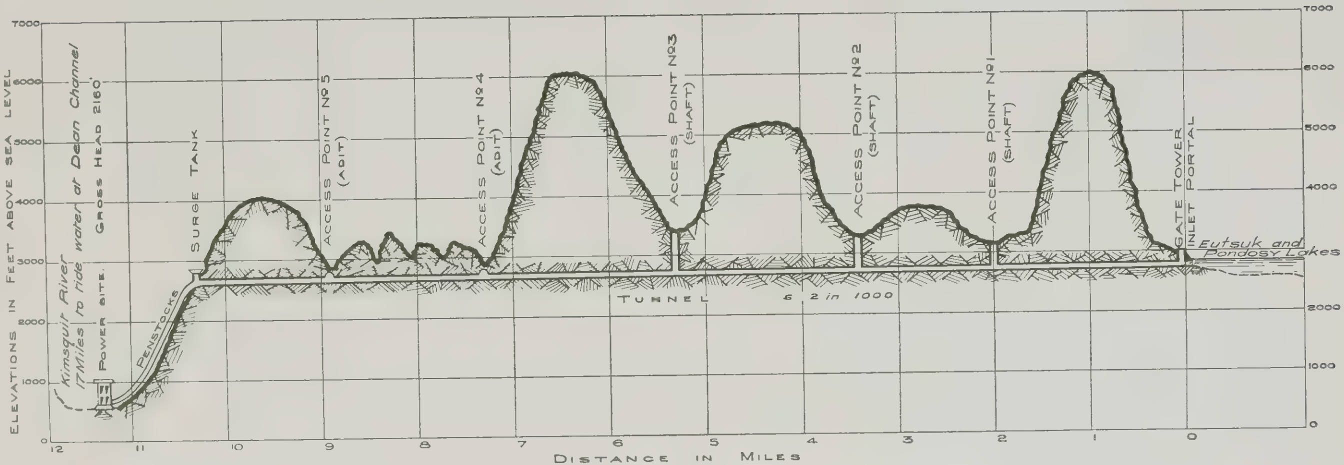
NECHAKO RIVER.

THE proposed use of the waters of this stream for the development of power is referred to as the Nechako-Coast diversion. There can be two quite separate diversions with the consequent development of power from the headwaters of the rivers to the Coast, neither of which would interfere with the other. One of these is from Eutsuk Lake to the Kimsquit River, which flows into Dean Channel, and the other is from Tahtsa Lake to the Kemano River, which flows into Gardner Canal. Both Dean Channel and Gardner Canal are deep-water inlets which freeze over in severe winters, but can be kept open without difficulty so that any industries established at these points would be directly accessible to ocean-going vessels.

It is understood the Nechako-Coast developments would not interfere with the fishing industry, as salmon are not known to ascend the Nechako River above the Grand Canyon.

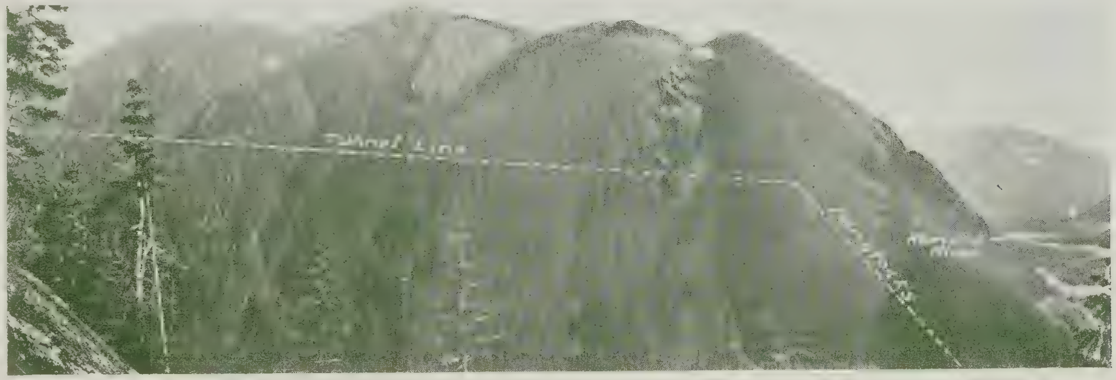
Eutsuk Lake to Kimsquit River.—Eutsuk, Pondosy, and Tetachuck Lakes, near the headwaters of one of the forks of the Nechako River, are nearly of the same elevation and have a combined area of 122 square miles. The main run-off, which can be completely controlled by drawing down the lake-levels, as indicated by the average flow for seven years, is 2,610 cubic feet a second. This may be increased by a further 1,200 cubic feet a second by a diversion from Whitesail Lake. The suggested complete development would require a dam 100 feet high at the outlet of Whitesail Lake; a cut 0.75 mile long through the portage between Whitesail and Eutsuk Lakes; a short cut to reverse the flow of the outlet of Pondosy Lake; a tunnel 10.27 miles long with access points not more than 2 miles apart; penstocks 5,200 feet long under a head of 2,160 feet to a power-house on Kimsquit River, about 17 miles from tide-water at Dean Channel, and 7 miles further to a suitable industrial site. The horse-power possible of development from Eutsuk Lake alone is 618,000, and with Whitesail Lake added there should be sufficient water for a total of 910,000 horse-power.

An alternative to this development proposes an outlet from the head of Eutsuk Lake through Musclow Lake; a tunnel 9.5 miles long with frequent access points; penstocks 3,000 feet long under 1,760 feet of head to a power-house at the junction of Smaby Creek with Kimsquit River, about 29 miles from tide-water, where 736,000 horse-power could be developed. The tunnel in either case would be in the sound rock of the Coast Range batholith.

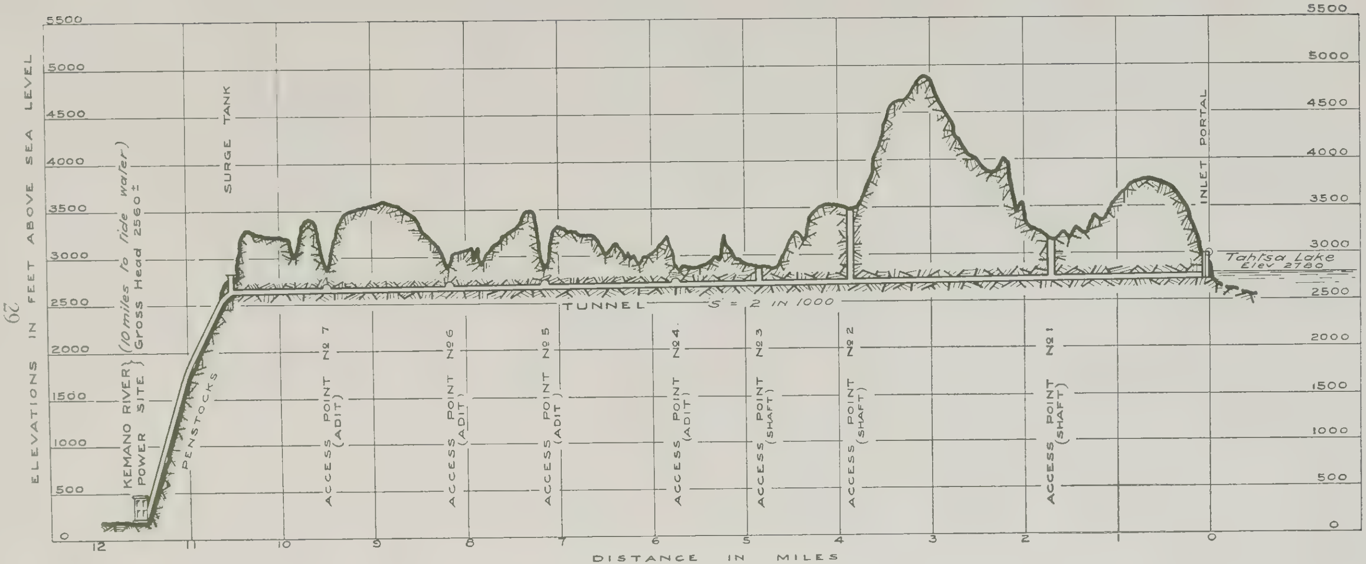


EUTSUK—KIMSQUIT SCHEME

Eutsuk-Kimsquit scheme.



Tahtsa-Kemano scheme.



TAHTSA—KEMANO SCHEME

The nearest rail point in the Interior is at Burns Lake, on the Canadian National Railway, which is about 43 miles from Ootsa Lake. From Ootsa Lake water transportation with one short portage can be utilized to any point on the lake system. A railroad with an average grade of 0.5 per cent. and of light construction can be built from tidewater on Dean Channel to the power-house site. From the head of the penstocks, a road or light railroad can be built to access points along the tunnel in either alternative.

Tahtsa Lake to Kemano River Diversion.—Tahtsa Lake, tributary to the Nechako, has an area of about 12,500 acres. The estimated run-off, which can be controlled by lowering the lake about 60 feet and includes the flow of the Troitsa River, is 2,000 cubic feet a second, as indicated by the average flow for seven years. The suggested development would require a tunnel 10.5 miles long with access points not over 2 miles apart, except for one section of 2.18 miles; penstocks 1.1 miles long under a head of 2,560 feet to a power-house on Kemano River, about 9 miles from Gardner Canal, where 563,000 horse-power could be developed. The flow may be supplemented by diversion from Nanika and Kid Price Lakes in the Morice-Skeena watersheds by a further 1,000 cubic feet a second, making a total of 845,000 horse-power possible of development. From Burns Lake, on the Canadian National Railway, the highway runs to Wistaria, on the north side of Ootsa Lake. From this point a tractor-road can be quite easily built the remaining 50 miles to the outlet of Tahtsa Lake. From tide-water a railroad of light construction 9 miles long with an average grade of 25 feet per mile can be built to the power-house site.

CONCLUSION.

FRASER RIVER is the largest drainage system and the most important stream from a power standpoint in British Columbia. But other river systems have large power possibilities. Columbia River, which is being intensively developed in the United States, has its origin in British Columbia. Through its tributaries it is now producing 250,000 horse-power, and is capable of a further 750,000 horse-power before it crosses the International Boundary. On the Coast 100,000 horse-power is now being used in pulp and paper manufacture. The coastal streams, of which the Cheakamus, Dean, Skeena, and Nass are the most valuable, can contribute in the aggregate a further 1,000,000 horse-power. On Vancouver Island 250,000 horse-power is available. It is evident that British Columbia has in its abundance of water-power an agency that contributes to its natural wealth and industrial opportunities.

ACKNOWLEDGMENT.

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